

Aviation News

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The Harpoon—Navy Land-Based Bomber: Lockheed Aircraft Corp. is now building the twin engine PY2-4 Harpoon bomber, a Navy-designed version of the company's Ventura PV-1. The Harpoon is called a substantial improvement over the Ventura, which was an older AAF plane. In outward appearance the two planes are very similar, but increased firepower is evident on the Harpoon. (Story on page 18).

Army, Navy Act to End Post-War Buying Ban

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Drastic NATA Remodeling Tightens Statements

Board action "fences off" president's power to take action in association's name without prior board approval.....Page 35

Flight Instruction Experiments Point New Techniques

University of Tennessee program expected to have far-reaching effect on civil pilot training here and abroad.....Page 38

Services Slashing Schedules

Both Army and Navy are preparing to slash aircraft schedules, with telegraphic notification to contractors expected at any time. The Navy, which has been receiving over 2,000 planes out of the national monthly average output of approximately 5,000, probably will cut its September goal to less than 400. Its October, November and December schedules will drop progressively to 300.

Under schedules previously effective, aircraft production for both services was to remain at a level close to 5,000.

► **AAF Program**—Plans of the AAF are not as far along as the Navy program, but Washington officials expect its decreases to be at least as drastic as the Navy's. General Motors is expected to be out of aircraft production within 60 days.

The Navy under its new schedules probably will seek further deliveries of only 7 or 8 models, including the PB4Y-2, the FR-1, TBM, PBV-6A, R5D, F7F, F8F, and PBM-5, plus some experimental planes.

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THE AVIATION NEWS

Washington Observer

TOOLING PROBLEMS.—Aircraft manufacturers are still faced with the problem of how to reconvert to civilian production when they cannot buy jigs, dies, and fixtures in government-owned plants which are tooled up for producing the types of planes needed by airlines and industry. Machine tools in privately-owned plants can be purchased under Surplus Property Board Regulation 6, but this does not cover government-owned plants.

AAP TO AID.—Government circles say that AAP has asked SPS to review Reg. 6 with the intention of permitting tooling in government-owned plants to be bought by all companies AAP does not admit this, but cautious SPS officials say they are now drawing up a revision of Reg. 6. Hugh Cox, new SPS general counsel, is said to be favorable to all possible aid to the aircraft industry.

PLANT DISPOSAL.—Another regulation, number 10, on plant disposal, is being circulated in SPS for comment and review. Finished version may be different from present one, thus a rebroadcast in SPS to discuss it. Another factor in SPS' uncertainty on this score is thought to be AAP's views on plant disposal—which are on record to the extent that AAP wants an individual potential quickly available in time of war.

WFR AIRCRAFT DIVISION.—It seems likely that the standard Aircraft Division at War Production Board will be abolished completely instead of leaving one man and one consultant on the payroll. This does not mean aircraft will be deserted. It will be placed under the charge of the Agency Rating Committee which handles which industries and plants need material, manpower. This move would involve abolishing P-41a, and a definite decision has not been reached.

LABOR AID FOR PLANE PLANTS.—Aircraft Production Board is asking WMC to give special manpower assistance to certain critical aircraft plants. Several Navy facilities are on the urgent list. This action follows complaints of several aircraft factories, chiefly those on the West Coast, that they were having difficulty getting workers with certain skills. Although thousands of aircraft workers have been laid off due to cutbacks, few highly-skilled men have been released. Many of those released have disappeared from the labor market and



New insignia for Superfortress flight engineers

others are seeking civilian-type jobs with post-war pensions. Result is that plants getting orders for emergency production and modification are hard put for labor.

END OF IDENTIFICATION CARDS?—Washington officials say there is a good chance that the pecky identification cards required of all new CAA-certificated pilots since the outbreak of the war may be discontinued in the next three months. The progress of the war makes such action overdue, in the opinion of personal flying observers, who point out that the Coast Guard dropped its identification card requirement for all private boat owners as long ago as last April. Action probably will be cleared through the Inter-Departmental Air Traffic Control Board.

MILITARY AIRPORT DISPOSAL.—Pressure is increasing monthly on Army and Navy officials from municipalities to make decisions on post-war service use—of many of nearby military airports. Few cities are getting anything more than unofficial hints, however, chiefly because the services consider it necessary for Congress to decide first on the size of any post-war military machine. As far as can be learned, the problem of fields too large for cities to support is being given attention by no top officials in Washington.

HEAVIER CARRIES PLANES.—Navy is expected soon to revise the number of plane types to be assigned to carriers. The percentage of fighters, torpedo bombers and dive bombers on a carrier is a matter of continuous study and adjustment. Tactical considerations govern decisions on complements and these decisions have a distracting effect on navy aircraft production schedules. The tendency until now has been to increase the percentage of fighters but developments in the Pacific War indicate that this might be reversed. There is a minimum of

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Army, Navy Act To End Ban On Post-War Aircraft Buying

Attorney General asked for interpretation of Reconstruction Act provision looked upon as industry 'death warrant'; strict application would halt development, some military orders for nearly two years.

By WILLIAM KROGER

The aircraft industry's uncertain future, hazy because of legal requirements that contracts must promptly be cancelled when not necessary for the prosecution of the war, is expected to be clarified shortly.

Acting at the request of the Army and Navy, John W. Snyder, new director of the Office of War Mobilization and Reconstruction, has asked the Attorney General for interpretation of Section 202 of the War Mobilization and Reconstruction Act of 1941.

'Killing' Close—So sweeping are the prohibitions in that section that industry has long regarded it practically as a death warrant.

Under strict interpretation, it would not only shut all research and development work for the military service—once the war was over—it might even mitigate against any military orders for nearly two years, or until the act expires on June 30, 1947.

This view is shared in large extent by the National Planning Association, independent group of business, civic, professional and scientific leaders, which has warned that military procurement of aircraft is essential after the end of the war if a complete production stoppage is to be avoided (Aviation News, June 25).

NPA Plan—In its report, NPA recommended that, in view of Section 202, all government agencies concerned take steps to assure a continued program of military aircraft procurement when war necessities cease. It is learned now that, pending final determination of the precise applicability of Section 202, both the Army and

the Navy have prepared budget recommendations for aircraft purchasing which will be submitted to Congress promptly if the need arises.

However, the latest issue may make such a step unnecessary. The Army and Navy have been so anxious as the aircraft industry to find a way out of the dilemma, as they see their whole future development program imperiled at this moment.

It is believed the request to the Attorney General, for a ruling, suggests two possible "outs." One is in Section 302 itself, a clause of which provides that contracts can be continued if "the Office of War Mobilization and Reconstruction finds that the continuation . . . will benefit the government or its economy or avoid substantial physical injury to a plant or property."



P-40, BULLET WITH WINGS:

Looking like a winged projectile in this new, revealing photograph, the P-40 Shooting Star's exceptionally clean aerodynamic lines are shown as the Lockheed jet fighter swept over Murco Dry Lake, Calif. Only disturbance is an obviously innocent scar on the sleek body are the two wing-root air scoops and the pilot's cockpit "bubble." A more pronounced fuselage taper is also revealed in this overhead view than in "blonde" pictures.

PT Sales Drop

Sales of surplus military training planes have fallen from the 900 mark, in April, to 410 in July, according to a late tabulation of the Office of Surplus Property of the Reconstruction Finance Corporation. Figures for the four most recent months on the sale of primary trainer are:

	Number	Price
April	900	\$1,842,160
May	488	\$934,475
June	501	\$534,710
July	410	\$427,507

In addition to the sale of 47 Lockheed Lodestars at \$1,033,000, BPC has leased 35 Lodestars at an annual rental of \$83,124. Up to July 18, 349 Cessnas had been disposed of at a price of \$1,077,375, and 81 Valiant basic trainers at \$54,100 had been sold through July 22.

'Benefit'—The services feel little hesitancy in claiming that continued production of aircraft after the war will "benefit the government."

Already, top AAF and Navy officials, as members of NPA's advisory committee on the aircraft industry, have expressed the opinion that "it is considered that Seco-

'Atomic' Aircraft Development Seen Far-Off By Industry Heads

Enormous aviation field re-assessing propulsion knowledge in light of "bewildering" atomic energy disclosure; consensus, however, points to vast difficulty of harnessing force to machinery.

By BLAINE STUBBS

All segments of aviation, the aircraft industry, aeronautical engineers, and military aviation authorities, last week were busily re-examining their knowledge and progress in aircraft propulsion in the wake of the disclosure that atomic energy had been utilized for the first time.

Initial reactions were akin to bewilderment. Many industry sources frankly confessed they were unable to comprehend exactly what the future held in store in regard to the use of the basic energy of the atom. All, however, pointed out that releasing that energy in a burst and harnessing it in a machine were two different things.

Time Unknown—Much control will be required in the design of atomic engines, and even the high-

est authorities would not guess how many years it would take Designer William B. Stout, for one, was quoted in the press as saying he expected internal combustion engines to be the rule in his lifetime.

Overall, though, success of the "Manhattan project," and the atomic bomb attack on Japan have brought out initial speculation that the first "atomic" reaction will be converted to aircraft propulsion through the medium of rockets.

Aerodynamists, groping for appreciation of the potentials of the development, explained that if atomic energy can be controlled and harnessed for aviation it will open new vistas in power available, in speed and in range. In fact, range might be unlimited—meaning the aircraft could go to

any point on the earth and arrive at near its maximum gross weight, due to the small percentage of weight in "fuel."

Fuel Space—Not only the weight of liquid fuel, but its cubic volume, will soon be a limiting factor in supersonic flight with small airframes unless jet power's little blade-wing wings are so thin they do not have the necessary storage space.

National Advisory Committee for Aeronautics, top-ranking government agency in pure research, said that present aircraft engines, operating through chemical reaction of fuels (burning), show very high fuel consumption and a "staggered" waste of energy.

Only about one nine-millionth of the total fuel energy, NACA spokesmen said, is utilized when reckoned on an atomic basis. Only 130 BTU per pound obtained from nuclear reactions (breaking) of atoms and oxygen, while for the fusion type of reaction, about 35 billion BTU per pound can be obtained.

An atomic engine, utilizing the tremendous energies released through the splitting of atoms, NACA states, "is viewed as a distant possibility for aircraft propulsion, particularly for supersonic (rather than subsonic) speeds." Spokesmen emphasized the magnitude of the problem of controlling atoms smashing within engines.

Engine Guess—No one knows at this time just what form of engines may be powered by the energy of released atoms. Scientists questioned said they would guess the piston type engine would be bypassed entirely. The rocket was their first choice for aviation, and some form of turbine for other power.

It was stated definitely that atomic power plants will be independent of air for camouflage. Since their thrust will be pure reaction (law of equal and opposite reaction) like the kick of a gun, they will not depend, as does the screw propeller, upon air reaction and vacuum for thrust.

In fact, though it is not commonly realized, the thrust of present jets and rockets is "pure" reaction, not deriving from contact with air. Therefore, if a sustained atomic-powered plane will fly in high, thin atmosphere, with near-zero per-mile consumption of energy in drag, it is further suggested that wingless flying machines might be developed in such a way that they will go entirely beyond the atmosphere.

Foreign Surplus Priorities Outlined

FEA purchases gas top priorities, with American non-profit institutions second.

Priorities and procedures for disposal of surplus aircraft and other supplies already have been outlined by the Army-Navy Liquidation Commission's Office.

Sales to the Foreign Economic Administration, and only for its own use in foreign areas, but also when acquiring property under Lend-Lease or for UNRRA, will receive top priority for purchase.

American non-profit institutions, including academic, literary, educational, public health, charitable or hospital groups, are given next preference with American manufacturers or distributors following.

Rebid Bidding—Foreign governments are given priorities, regardless of the location of the surplus property, for making purchases needed in relief, rehabilitation and reconstruction. State Department and FEA will be consulted on these sales. Next in order is the country where the surplus is located, if desired for other than relief purposes.

Certain conditions have been set for sale of surplus aircraft overseas and all surplus out of this country by ANLCL. Power to establish these priorities and conditions was given ANLCL by the amendment to Regulation 5 of the Surplus Act.

According to the Commissioner,

Sales Abroad

Disposal of surplus airplanes and aircraft equipment overseas has been slight, so far, because there have been few aircraft available. None, however, aviation division of Army-Navy Liquidation Commission reports the British have mirrored some of the U.S. lend-lease to them at the beginning of the war and also some PT-26 amphibious trainers.

Private Overseas Magazine, returned from the British, are being brought back to the U. S. for sales. A number of engines suitable for Cessna's have been declared surplus.

Australia has purchased 12 war weary transports although the sales have not been completed.



Overseas Aircraft Disposal: This is the first chart issued by the new Aircraft Division of the Army-Navy Liquidation Commission, since this division transferred from the Foreign Economic Administration. This group is charged with disposal of surplus aircraft overseas and functions of the branches and sections were described in AVIATION NEWS, Aug. 6. William Brinkerting is director of the division and Robert McKelchen is deputy.

no contents, defects or similar changes on the property will be levied against the U. S., goods will be sold "as is" without warranty except as to title; goods will be sold where they are and possession must normally be taken within 30 days of sale, where the purchasing government plans to sell surplus goods, provision will be made that distribution does not discriminate against U. S. concerns in that country, with minor exceptions, no surplus purchases can be reimported into the U. S. in the same or substantially same form.

Price Formula—A brand formula for determining a "fair value" has been established. Elements of the pricing formula are: current procurement cost of item plus 25 percent mark-up for transportation, handling and insurance, less depreciation for physical condition; and less depreciation, at any, for military utility as compared to civilian utility. Depreciation for military utility will be a big element in pricing some items built expressly for war purposes, such as heavy bombers and fighters, it was pointed out—M. P. P.

Bendix Foreign Market

Use of Bendix Aviation Corp. designs in military equipment overseas has stimulated an interest abroad in peacetime employment of Bendix products, the company

announces in revealing formation of a new division; Bendix International.

The organization will handle export sales, manufacturing abroad, and licensing of foreign manufacturers to produce Bendix products. General manager is Charles T. Zaeris, and offices are at 30 Rockefeller Plaza, New York City.

Army Now 'Cans' Guns, Plane Parts

Steel and aluminum containers are being used by the Army to "can" aircraft machine guns, engines, instruments, and other accessories and weapons up to anti-aircraft guns. Equipment stored in the containers needs no grease coating and no maintenance, but require in ready-to-use condition indefinitely.

Only such war items as will not become obsolete in the early future are canned. Likewise, items suitable for use by civilians, such as trucks, cars, machine tools, construction equipment, are not listed for sealed preservation.

Martin Role—Manufacture of containers has been progressing, under security restrictions, since last April. Among the producers is the Glenn L. Martin Company, Baltimore.

The steel containers are welded



PHOTO EQUIPMENT ON B-29:

Army Air Forces have converted one B-29 Superfortress to photographic planes designated P-23. Pictured is the interior of an F-13 shooting, in the rear, three Fairchild color cameras of type K-17b with 8-in. megaplex lens cones; called a tri-camera installation and used for aerial charting. The two cameras in front are split aerial installation and probably K-17s according to the War Department. These cameras have 24" lens cones and are used principally for reconnaissance, but also used in charting.

momentarily light, nitrogen gas is pumped into the can replacing the air and the oxygen, which causes rust. Aluminum containers cannot be welded to withstand changes of treacherous Arctic regions. Instead of being filled with nitrogen they are equipped with a dehumidifying vent charged with silica gel.

RCAF Establishes Special Test Unit

A research department has been established by the Royal Canadian Air Force and, at the same time, the RCAF is starting on developing jet-propelled aircraft, it was announced at Ottawa.

The new research and development branch of the RCAF is headed by 35-year-old Air Vice-Marshal S. W. Sordman, and will initiate and coordinate all research and experimental work for the RCAF as well as working closely with the Canadian aircraft industry. It will also act as a liaison on research and development subjects between the RCAF, other services, and outside organizations.

Emerging Needs—In announcing the creation of the new branch, Air Vice-Marshal Sordman stated that research for defense is one of the most pressing needs of the post-war era, that the work can no longer be left to a small professional fighting service, but must be the concern of every citizen and particularly of every one with professional and scientific training. Sordman has been associated

Interior Planes

Plans of the Department of Interior call for large-scale use of aircraft in various types of operations in the post-war period.

As a step in this direction, the Department requested and was granted authorization to hire, maintain, and operate planes in its 1946 fiscal year appropriation bill.

Aerial response will be used by the Department's Bureau of Reclamation in drawing up emergency plans for a huge backlog of widows (insurance plans), totaling over \$5,000,000,000 slated for post-war construction.

Varied Uses—The Department will also use planes for the following purposes: to spot breakage in power transmission lines; fire-control, fire-control, weekly range finding apparatus, predatory animal control; for rescuing isolated communities in Alaska where the Indian Service maintains schools, hospitals, and other facilities; for use in emergency on safety and order work; for game law enforcement.

with the technical side of Canadian aircraft for the past 25 years, was appointed technical director of Canada's first Air Board in 1920.

A jet-propelled aircraft is now being designed for the RCAF by the government-owned Turbo Research Ltd., affiliated with the government-owned Research Enterprises

group, Ltd., Toronto. Canadian aircraft have been closely connected with gas turbine and jet propulsion aircraft development since July, 1942, when experimental work was started in Canada, and Canadians were sent to Great Britain to work with development engineers there.

"Meteor" Tests—To and Turbo Research and the RCAF, it is understood that a Gloster Meteor is soon to arrive in Canada for experimental work. This was the only jet-propelled aircraft among the United Kingdom's jet fighters to go into action against the Germans.

British Appoint First Civil Aviation Attache

Following the example set by the U. S. some months ago, Great Britain has begun the appointment of civil air attaches in its embassies. The first to be appointed is Peter Mansfield, noted British aeronautical engineer and journalist, who has arrived in Washington to assume that post in the British Embassy.

Mansfield was previously in this country, last summer, as an adviser to Lord Beaverbrook when the latter was engaged in preliminary conversations with the State Department on international civil aviation. Prior to that, he was a British war correspondent and covered operations of the U. S. Eighth Air Force. In 1943 he made a tour of U. S. and Canadian aircraft plants and training centers at the invitation of Gen. H. H. Arnold.

Newest Burnelli Flying Wing Starts Initial Canadian Tests

Canadian Car and Foundry Co., Ltd., latest concern to build prototype along lines of design previously tried here and in England, begins flight trials at Montreal.

A new version of the Burnelli Flying Wing is undergoing initial flight trials at Montreal under direction of Canadian Car and Foundry Co., Ltd., latest concern to tackle the development.

The Canadian Car prototype, designated the CBV-3, has provision for 24 passengers and 700 cubic feet of cargo space. TACA Airways, parent company of operators of far-flung routes in Central and South America, has shown an interest in the Burnelli, which is built to meet flying conditions in areas where restricted ground facilities predominate.

New Interest—Development of the Burnelli design has been under way in Canada for many months. TACA at one time was watching closely its progress and then cooled off. Apparently now there has been a revival of interest.

Canadian Car's Burnelli is, like predecessors, an all-metal high-wing twin-engine transport with passenger and cargo compartments completely enclosed in a wing 20-ft. wide with a 30-ft. chord. Span is 30-ft., seven feet more than a Burnelli design built in England by Constellation several years ago.

Power is supplied by two Pratt and Whitney 1,200 horsepower engines. The undercarriage, of the conventional tailwheel type, is fitted to the rigid fuselage structure. Both main and tail wheels have dual tires.

Quick Loading—The arrangement of the interior has been designed to give maximum facilities for quick loading and unloading of bulky articles of freight. The freight compartment is 20-ft. long, 10-ft. high and is accessible through two doors in the ends of the compartment, each four feet by six feet. In the passenger compartment are exceptionally large windows.

The CBV-3 has a maximum speed of 280-mph, somewhat less than the Burnelli built in England. The Canadian-built version has a cruising speed of 185-mph, carrying three to three and one-half tons payload. Range is 2,000 miles

The original Burnelli was built in this country in the middle thirties by the Oppenheimer-Burnelli Aircraft Co. of Koppers, N. J., test flown by Clyde Pangborn, but later abandoned completely.

Twin Gun Turret Periscope Revealed

A double-ended periscope features the latest type of remote control gunnery system used in the A-24 light bomber. It is revealed by General Electric Co., maker of the equipment.

With one end of the periscope protruding above the fuselage, the other below, the manner has an unlimited field of vision, which is viewed out of sight inside the plane and protected by armor. Twin turrets, each with two 20-caliber machine guns, are located above and below the fuselage. Both are fired by remote control, with cut-off devices limiting the field of fire to the proper quadrant.

Quick Flip—As the gunner re-

views the periscope to keep the sight on the target, the gun turret moves accordingly. A flip-over mirror within the periscope moves so rapidly the gunner can keep an attacker in view as he passes from above to below the plane.

New Warning Unit Seen Radar Rival

CAA, industry tests loom for Panosonic Radio Corp., Kellman airborne electronic anti-collision system.

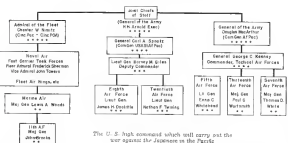
An electronic warning principle, which may compete with radar for ultimate wide application as an aircraft anti-collision system will be thoroughly tested in the early future by CAA and the aviation industry.

The instrumentation of the development, called "interceptor," was announced by Panosonic Radio Corp. of New York, and the Kellman Aviation Instrument Division of Square D Co., Elmhurst, N. Y., with a new test to the recent collision of an Army biplane with the Empire State Building.

Prophecy Fulfills—According to the company, on the day preceding the accident CAA and Panosonic engineers discussed the possibility of installing Panosonic-Kellman test equipment in the building.

The system is not radar in prin-

PACIFIC AIR FORCE CHART



The U. S. high command which will carry out the war against the Japanese in the Pacific



Invaders Line-up of A-24 Douglas-built bombers, on the assembly line. Newest and fastest attack bomber, the Invader is equipped with centralized, remote control armament featured by a double-ended periscope built by General Electric.

cycle, but embodies proven points of radio operation and the use of a sensitive aneroid diaphragm altimeter similar in type to standard navigational equipment.

Electronic specialists indicate that the Panamint-Kollman system simply gives a visual or visual signal, actuated by an airborne receiver when it comes within range of a transmitter located on the obstruction.

Plane Cost—Dr. Marcel Wallace, president of Panamint, and co-inventor of the system, said the airborne equipment would be light and "moderately inexpensive" and that installations on obstructions would be "not too costly or difficult."

Technicians and test pilots of the two companies have been working on the stratoscope for the past year and one-half. Dr. Wallace and Victor Carbonara, vice-president of Squire D, said that unless use of the stratoscope were general, overall protection could not be realized. They contend, however, that even limited use by military and commercial aircraft, and to the highest obstructions, would substantially reduce the possibility of accidents.

C-W Clutch Plant Expansion Begun

As expansion program including the purchase of new manufacturing facilities and a replacement of top officials is revealed by the L. G. S. Spring Clutch Corp., wholly-owned subsidiary of Curtin-Wright Corp.

The firm has acquired the Mars Hill building and properties in Indianapolis that are now being operated by the Allison Division of General Motors. The L. G. S. plant will be moved to Mars Hill soon.

Executive Shifts—The announcement of the purchase of the property was made concurrently with the disclosure that W. W. Gleason, former vice-president and general manager, has been elected president of L. G. S., succeeding Guy W. Vaughan, president of Curtin-Wright, who now becomes chairman of the board of the spring firm.

The company's new location will be a 30-acre layout near Stout Army Air Base at Indianapolis. The main three-story building contains 86,000 square feet of floor space, with an additional 91,000

FEA Sales To Foreign Purchasers

The following is a compilation, through June 30, of Foreign Economic Administration sales of miscellaneous types of surplus aircraft to foreign purchasers. All these aircraft were from Defense Plant Corporation stocks in this country.

Type	Purchaser	No. Planes	Unit Cost	Total
DC-30	TACA	2	\$10,800	\$21,600
DC-30	For Air de Brasil	2	\$10,800	\$21,600
	Aero Espinosa	2	\$10,800	\$21,600
UC-43	Argentina	1	\$10,800	\$10,800
C-70	TACA	1	\$10,800	\$10,800
DC-70	Gov. of Haiti	1	\$10,800	\$10,800
	Gov. of Haiti	1	\$10,800	\$10,800
L-2	President Jose Gomes	1	\$10,800	\$10,800
L-2	Joseph Berthe	1	\$10,800	\$10,800
L-2	Henry Kiehl	1	\$10,800	\$10,800
PT-23	Chile Aero Club	99	\$10,800	\$1,069,200
	Gov. of Guatemala	2	\$10,800	\$21,600
	Gov. of Haiti	2	\$10,800	\$21,600
	Aero Corporation	13	\$10,800	\$1,404,000
	Lebanon Aero Club	1	\$10,800	\$10,800
	Joseph Marston	1	\$10,800	\$10,800
	Air Union, Inc.	30	\$10,800	\$3,240,000
Total:				\$42,240,000
PT-23	Sweden	4	\$1,200	\$4,800
	Norway	1	\$1,200	\$1,200
Total:				\$6,000

square feet available in smaller buildings.

Swedish Line To Extend B-17 Use

FEA list reveals ARA is now for-
fees customer, "temporary" use
of converted bombers now be-
lieved more permanent.

An indication that the Swedish airline, ARA, may be planning to use converted B-17's on international passenger routes for a longer period than originally expected is seen in statistics of the Foreign Economic Administration listing surplus sales abroad.

As the greatest purchaser of aircraft parts, ARA paid \$118,877 for B-17 parts located in England, and \$10,692 for nine Wright engines in Sweden. It has been thought ARA's use of converted Fortresses is a stop-gap measure pending delivery of surplus or new transport equipment.

Type Tally—A recapitulation of FEA aircraft sales for export from Defense Plant Corporation stocks through June 30 of this year shows a total of 30 DC-3 aircraft going abroad at an aggregate price of \$3,031,606, and 18 Lockheed being bought by foreign airlines for \$568,450.

As a possible measure of the condition that might prevail at the end of the war in regard to surplus combat planes, FEA's report tabulates 683 aircraft, costing \$115,813,894, which are located

abroad and have been returned to the Army as unsuitable. They will be scrap-sold. Large group in this category are 147 B-24's, valued at \$84,146,827.

In the same connection, FEA has returned to the owning agency for salvage combat aircraft, components and parts worth \$97,958,345.33. Parts of non-combat aircraft held in storage—on the possibility they might be saleable—have a value of \$4,666,119.77.

Martin Adds Millions To Backlog of Orders

Backlog of unfilled orders for the Glenn L. Martin Co., and subsidiaries, grew during the first six months of this year from \$18,482,200 to \$65,960,442.

At the same time the organization realized net sales amounting to \$193,487,196 and a consolidated net income of \$4,747,588, before reorganizations and after reserves for taxes and contingencies.

Market Drop—Market appraisal of the company at June 30, was \$31,056,973, or 24 1/2 per share, compared with an evaluation of \$43,265,000 when the stock was selling at a record 47 1/2 in 1940.

Although the market appraisal declined \$20,213,835, the company increased its working capital from \$11,251,696, in 1940, to \$20,587,258 that year. A jump of \$8,715,696 beyond that, there was net cash \$28,606,000 in funded reserves for contingencies, including reorganizations and post-war expenses and adjustments, during the five years.



Over a century ago an Englishman named William Samuel Wright prepared to fly an aircraft between England and China. His model airplane (pictured here after a model at the Smithsonian Institution) prefigured the rubber-tire engine and the single wing (shown below) which he claimed the wing would support the engine.

THE FIRST MONOPLANE (IN 1842)

was designed with high hopes but little Lift

To fly, an airplane concentrates two factors of air: Lift that comes from air passing around the wing and Drag, resistance of air to the plane's movement. How much lift is determined by the ratio of Lift over Drag.

Many of the "facts" at Northrop have been steps to reduce Drag or to increase Lift. In Drag reduction, you find Northrop pioneering the stream-lined monocoque fuselage (1927).

wing (1929), the all-metal stressed skin monocoque (1930). And before riding of magnesium (1930) which promises still lighter, smoother aircraft construction.

On the side of Lift are Northrop's development of split Aps (1932), retractable ailerons (1931) and the Flying Wing The first Northrop "wing" free of conventional tailings. Yes, in 1931, later versions have

hugged everything inside the wing, eliminated all tail assembly.

The battle of Lift versus Drag will continue into the future. In fact as at Northrop are set up to create both more efficient propellers and planes of still more advanced design. Plans to fly men higher, faster, further and so on less than ever before.

Northrop Aircraft, Inc., Northrop Field, Hawthorne, California.



Creators of the **Black Widow**

P-61 Night Fighter and the **Flying Wing**



NORTHROP



C-W Staff Changes Bring New Officers

Livingston Belsbeck now heads Curtin-Wright Corp., newly acquired by Avco; other companies announce changes.

In major staff changes in Curtin-Wright Corp., the board of directors has elected Gladding B. Colt, treasurer and controller, who has been vice-chairman of the Reconstruction Finance Corp. Price Adjustment Board.

Mr. Alexander R. J. Lindquist who has resigned to become financial vice-president of the Standard Oil Co. of Indiana, Colt served in the U. S. Army as chief of the Bene-



Colt Brundewiede

gotiation Branch of the War Department in Washington. He is currently a member of the War Contracts Price Adjustment Board.

Gregory J. Brundewiede, general manager of the Curtin-Wright plant at Leansville, Ky., has been appointed director of sales of the Curtin-Wright divisions. His headquarters will be in Buffalo and he will coordinate commercial and military sales of aircraft.

He joined the Curtin-Wright Aircraft and Motor Co. in 1947. **Head Cracks**—Livingston Belsbeck, president of the Aviation Corp., has been elected president of the Cradley Corp., a controlling interest in which has been acquired by Avco, in a transaction involving a payment of over \$12,000,000.

Mr. Belsbeck, who has held his Avco post since February, is also chairman of the boards of Consolidated Valve Aircraft and American Central Manufacturing Corporations, two other associated Avco companies. He formerly was a vice-president of General Motors, and president of Yellow Truck and Coach Manufacturing Corp.

PACAC—Edward W. Scott has been named a vice-president of TACA Airways, S. A., parent company for the TACA airlines in

Wright Denial

Greville Wright has telegraphed Aviation News a categorical denial of recent newspaper reports that the Wright Brothers Kitty Hawk plane would be brought back from England soon.

He referred particularly to two stories appearing in New York and Washington newspapers reporting that the Wright plane would arrive in this country about Sept. 13. It was also reported that it would probably be flown across the Atlantic in an Army transport, which first to Wright Field, Dayton, Ohio, for reconnoitering before it is placed in the national Museum at Washington, and that the Wright-Berthouliet controversy will end officially Dec. 13, on the first anniversary of the first Wright flight, probably with a "ceremonious celebration."

The telegram from the co-inventor of the airplane, at his Dayton, Ohio, home, last week characterized the first of the stories as having: "no foundation in fact and false from beginning to end, none of it even close to the truth (the second) equally false."

Apprehension was expressed among aviation leaders lest apparently well-meaning efforts to hasten the return of the Kitty Hawk plane to this country might have a boomerang effect.

Central and South America. Mr. Scott was formerly vice-president of the TACA Company in Costa Rica and assistant to President Lowell Yerxa.

Beech—Frank E. Hedrick who has been coordinator and assistant general manager of Beech Aircraft Corp. since Sept. 1940 has been elected a vice-president by the board of directors.

Ryan Order Cut; 1946 Work Assured

A cut-back by the Navy in the Fleetball, Ryan Aeronautical Co.'s jet fighter, reported by the manufacturer last week, will amount to an 18 percent slice in the original program but production will continue on a small scale through 1946 despite other nationwide plane cancellations which may be announced this week. The schedule previously in effect totaled nearly 1400 planes for

1943 and 1945. Production began earlier this year and has been running a few each month, with the rate to be "tripled" through the next 80 days. Thereafter production will level off until completion of the present program.

As is expected in the case of most companies engaged in jet and turbine work, Navy officials have assured Ryan that it will continue to operate under current aircraft schedules beyond V-J Day. President T. Claude Ryan, in announcing that about 1250 more employees are needed, said they are assured "continuity of employment" beyond the end of the war. Ryan has been at work on the FB-1 for about two years.

Husky Harpoons Revealed In Action

Evicted from Ventura PV-1, new Naval multi-purpose bomber has bigger, stronger surfaces.

Spartan, heavy, blue-black Lockheed PV-2 multi-purpose bombers last week were ranging the North Pacific to be in on the closing phases of the Pacific War as the Navy lifted accuracy restrictions from one of the latest aircraft to join its air arm.

The PV-2-4, designated the Harpoon, is the successor to the lighter PV-1 Ventura patrol bomber. While there is a family resemblance, the newer model presents several notable changes in size, performance, ability and firepower.

"Beefed" Up—The evolution of the Ventura to the Harpoon brought the addition of 125 square feet of wing area, improvement of control surfaces by redesign of the empennage, redesign of the wind-shield for greater visibility, and rearrangement of seating for greater comfort on long missions.

Two Pratt and Whitney R-3600 two-speed, supercharged engines developing 2,000 horsepower at takeoff give the Harpoon a speed of more than 300 m.p.h. and contribute to flexibility, making the plane excellent as a submarine hunter or low-level intruder bomber. The aircraft carries a crew of five.

For bombing and strafing, the Harpoon is equipped to carry a full-sized, 1,600-lb. torpedo and eight rockets. Other armament on the bomber is ten 50 caliber machine guns.

THE HYDRAULIC HAND PUMP WITH THE SEVEN-YEAR ADVANTAGE

THE NEW BENDIX PACIFIC 3000 PSI HAND PUMP



Latest development in the famous Pacific Division line of hydraulic hand pumps is the new 3/4 cubic inch capacity pump for 3000 PSI pressure. In performance, reliability and PSI output. In performance, reliability and PSI output. In performance, reliability and PSI output.

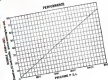
The pump incorporates a double-acting piston which produces equal volumes on push and pull strokes. An integral section check valve and the proven Bendix plastic poppet is mounted in right angle to the main bore.

Pacific Division
Bendix Aviation Corporation
10001 W. 10th Ave., Golden, Colo.

Weighing only 1.55 pounds, the new pump has been fully tested in accordance with Specification AN-P-14 (revised to 3000 PSI) and has met impact load requirements of twice the operating load on each stroke. Dependability and long life have been conclusively proven by the successful completion of a 250,000 cycle life test.

Maintenance has been simplified as all packings, nuts and bolts are AN Standard parts. The pump is available with or without handle. Complete data is available to engineering personnel of recognized manufacturers.

U. S. Pat. Nos. 2,518,950



COMMENTARY

Jap Air Production Dispersal Revises 'Simple Knockout' Idea

Popular conception of highly concentrated plane factory areas modified by disclosures of early decentralization of facilities; heavy production percentage destroyed but some plants soon producing up until late battle.

It has become necessary to revise the popular notion regarding the Japanese aircraft and engine industry. The idea has often been expressed that this industry, concentrated in an area no larger than the state of California and in a relatively few huge plants which produce the bulk of Nippon's planes and engines, should be far easier to knock out than were the widely scattered groups of German aircraft "conglomerates."

It probably will be somewhat easier, and there is no denying that an excellent start has been made, but the picture evidently needs some correcting if an aviator's view is to be avoided.

■ Nine Hit. The War Department has recently announced that nine of the main aircraft and engine factories have been very heavily damaged by the sustained B-29 attacks of the past six or eight months. These include such plants as Mitsubishi, Nagoya, and Nakajima's Komatsu and Ota factories, which together accounted for nearly 50 percent of Japan's total aircraft manufacturing production. Also included are the engine factories of Mitsubishi, Nagoya, Nakajima's Musashino plant, and the Naval Air Depot, Hiro. These nine accounted for more than 60 percent of the engines needed for combat aircraft.

From a peak production rate of more than 2,300 units at the close of 1944, the B-29 attacks from the Marianas, from November to February, knocked this down by about 25 percent.

■ "Smoking" On. The large-scale attacks which began in March, including the highly effective low and medium level incendiary attacks, knocked off another 30 percent to leave a total between 1,800 and 1,900.

By June this figure was up 40

percent, and yet there is little evidence that the heavily damaged factories are being repaired.

The answer appears to be that most of the Nakajima and Mitsubishi engine production has been dispersed to possibly a dozen smaller and well scattered plants, and that aircraft assembly has been still more widely decentralized.

■ Early Start.—It is now believed that this process was begun somewhat earlier than previously supposed, but reports that any considerable portion of the industry has gone underground may be discounted.

It is doubtful if the industry can survive the very heavy blows which will be struck when "Jimmy" Doolittle's B-29's from Okinawa add their weight to General Twining's from the Marianas, although some aircraft will probably be produced right up to the end.

During the past few months between 60 and 65 percent of the total production has been fighters, between 30 and 35 percent, bombers, and 10 to 20 percent reconnaissance, transport, trainers, etc.

■ Profitable Zees.—The only one of the lot in the 100-per-month class in the latest version of the 5-year old Navy Zero, Zero 5-2, turned out by both Nakajima and Mitsubishi. The faster, more heavily armed George is the only other Navy fighter coming out in quantity, though lack of alloy in the production picture. A good number of Fockes, the 400-mph Army fighter are being assembled in two Nakajima plants, fed by a number of smaller outfits, and 3-year old Tony (on-line engine) still has a good production.

Army's Oscar and Tojo are well on the way out, and twin-engine

Nick is being replaced with an extremely hard-hitting, high flying bomber reported as Bowsy. **■ Two 'Gals'**—Single-engine bombers are down to two types, Jill and Judy, both widely used in suicide attacks, as are bomb-carrying Zeke, and on occasion most of the other types. Twin-engine bombers have been reduced to three—Frances, Betty and Lily—and "reco" planes to Mary and Jake (Boris).

All the totals up to last then had the model in production a year ago, and the shake-down to a few of the best types is long overdue.

The Jap fleet-planes are among the world's best, and it is remarkable that the strategic situation resulting from the loss of the effective use of most of the outlying island bases has caused the disappearance from production of such good models as Rex and Paul, with only a few Jakes coming out each month. Another side-light on the rapidly shrinking empire.

NAVIGATOR

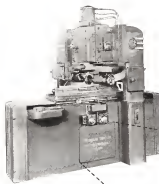
Navy Plane Towing Fits Post-War Role

What seemed for the moment a passing demonstration of spectacular on-the-spot ingenuity—the towing of a disabled Grumman Wildcat from Norfolk, N. C. to Jacksonville, Fla., by a Curtiss Helldiver—has now been revealed as one of a series of incidents with possible post-war implications.

The Navy announced last week that the Wildcat towing was the latest of six by the Jacksonville Naval Aircraft Modification Unit which has developed technique and devices for towing practically all military airplanes.

■ Hyvies.—Creator of the towing service is Captain Ralph S. Barnaby, a veteran glider pilot, now commanding officer of the modification unit at Jacksonville. While stationed at the Philadelphia Naval Aircraft Factory a few years ago, Capt. Barnaby suggested towing in a plane that had been forced down at Akron, rather than relying on the slower method of dismantling and trucking it to the base.

The fittings and technique developed since, have an economic, too, as well as the AAF and those participating in the towing service. The service is broader than after the war in getting civilian planes to overhaul stations.



Milgard Hydraulic Gear Pumps—Model 300—manufactured by Milgard Tool Company, Denver, Michigan.

engineered
fluid power
control



The hydraulic controls which make this machine—and millions of others perform with such reliability—call for tubing system based on the principles of Fluid Power Engineering.

When properly engineered and built, these systems have certain "must" features—

1. They streamline the flow of fluids. This permits adequate response to control with minimum system capacity.

2. They make minimum demands on the power source—an economy feature.
3. They fit into the available space, even when space is limited and cramped.
4. They are planned for easy accessibility to all parts—for service and maintenance.
5. They have the smallest number of joints and connections—all leakproof—even under high pressure, vibration or abuse.

FLUID POWER, engineered systems—with Parker valves, fittings and fabricated tubing meet these requirements. They are backed by more than twenty years of "know-how."

If you plan to use Fluid Power—if you need tubing installations for any purpose—ask a Parker engineer for recommendations. The Parker Appliance Co., 17325 Euclid Ave., Cleveland 12, Ohio. Booklet on request.

THE
PARKER
APPLIANCE COMPANY
CLEVELAND • LOS ANGELES
FLUID POWER ENGINEERING

New Resonance Jet Disclosures Show High Commercial Interest

Pasadena engineering company reveals five ounce test model delivering two pounds of thrust with the roar of a 1,500-hp. reciprocating engine; terrific noise, fuel consumption seen main problems

By SCHOLER RANGS

With partial lifting of the secrecy veil covering the nationwide development of resonance jet engines, there are strong indications of the amount of interest manufacturers are taking in possible post-war commercial production of the units.

Gabriel M. Giannini, head of the Pasadena, Calif., engineering company bearing his name, has been freed to talk about a five-ounce model of resonance jet engine which delivers two pounds of thrust and has the heavy roar of a 1,500-horsepower reciprocating engine. He considers it a "vast improvement" over the engines in the German V-1 buzzbombs.

► **Features.**—The model jet, so far built only for wind tunnel tests, employs a new and still restricted type of flutter valve, and runs on either gasoline or kerosene. At full power, it operates with an explosion frequency of several hundred times per second, and can be slowed down by reducing the fuel flow. The engine can be started with a single squirt of air from a bicycle pump. Once running, it needs no artificial air run to keep it going, even though stationary on a test stand.

Giannini says that another year of experimental development may take place before his company is ready to test the practicality of an "autoflight"—his company's trade name for the engine—is an airplane.

Until then, major problems will be to better or reduce the engine's air-polluting roar, and to improve fuel consumption, which is now too extravagant to appeal to private plane owners. Hard at work on these objectives are two young engineers to whom Giannini gives credit for the development of the engine: A. J. Klase and W. B. Goodman.

► **Noise Fight.**—A step toward noise control is the high frequency of the explosions in the engine, Giannini believes. He said, "With the higher frequency, six times that of this

German engine, we have better chances of isolating both sound and vibration."

On the test stand, the model engine is given a starting squirt of compressed air which picks up the fuel spray, sucked into the intake ahead of the flutter valves. A small spark plug, operating under continuous spark, touches off the initial charge of vapor with the bang of a 18-gauge shotgun. After a few seconds of intermittent explosions, the engine's chamber begins to glow red and it starts to run with a great roar, emitting a streamer of these 13 feet beyond the tail pipe.

When the engine is running smoothly, the spark plug is switched off and the explosions are auto-sustained. Techniques running the tests must wear ear-plugs or suffer partial deafness for several days.



NEW NAVY EYES—"SHUT"

The unusual noise of the Navy's newest, most powerful, secret-observation plane, the Seahawk, shows the narrow space required for storage aboard ship when the wings are folded. When the big Curtiss plane opens up, however, it is a formidable advance to the Tokyo-based task forces of the Pacific fleet. Indication of its high performance is the four-bladed propeller.

Buy War Bonds



For years, one of the world's largest manufacturers of electrical equipment, Auto-Lite's 22 plants are today producing large quantities of fine electrical equipment for aircraft. Pictured here are some examples of these precision-built products.

THE ELECTRIC AUTO-LITE COMPANY
LANSING, MICHIGAN TORONTO, CANADA



Outstanding features of these great spark plugs are (1) Direct contact semi-conductive center electrode tip (2) Improved copper cooled center electrode (3) High dielectric strength and superior mechanical properties of "Cerudum," Auto-Lite's insulator material.



Combining the advantages of low-cost mass production and precision manufacturing, Auto-Lite valves are available for both maintenance and industrial duty. They are built to exceed the most exacting performance requirements, achieving outstanding life in vibration, acceleration and altitude tests. Such types are operative from minus 50 deg. F. to 250 deg. F.



Auto-Lite batteries, noted for their brilliant performance records, are available in both 12 volt and 24 volt types. All are equipped with special non-spill vent plugs and assembled in airtight hard rubber or radiation-shielded aluminum containers. The heavy duty battery has a capacity of 105 A.H. at 5 hr. rate; others have capacity of 35 A.H. at the 5 hr. rate.



Auto-Lite Shockless Aircraft Ignition Cable is used as standard equipment in aircraft engines where wire can be carried or held in place with metal guides or conduits. Some of its noteworthy features when it is shielded electrically are: Longer cable life, increased life of spark plug electrodes and higher peak secondary voltages with the same primary coil current.

AUTO-LITE

TUNE IN "EVERYTHING FOR THE BOYS" STARRING DICK HAYNES—EVERY TUESDAY NIGHT—NBC NETWORK

"Precision Age" Seen By Builder

Adel Instrument company head asserts post-war mechanical products will maintain and often exceed high precision standards set during war.

When Japan is whipped, United States manufacturers of consumer goods very possibly will continue the high precision which has become habitual in their manufacture of war goods.

The buying public may expect to receive over the counter a degree of manufacturing excellence that will meet and even exceed the workmanship which before the war provided world markets for many products of German industry.

Air Meaning—That an indication of this important trend should come from the aircraft industry is significant.

William A. De Rudder, newly-elected president of Adel Precision Products Corp. at Burbank, Calif., brought it into focus in discussing his company's approach toward post-war manufacturing.

A major part of this company's military production has been in the manufacture of a multitude of aircraft hydraulic valves, hydraulic electric pumps, and hydraulic assemblies.

Tight Work—Such products call for an absolute mating of joints and component parts to withstand high fluid pressures, and the micro-finishing of valve seats and faces.

In view of this there seemed to be disagreement between De Rudder's assertions that Adel now is securing its piece structures for downward scaling, and that Adel is preparing the post-war manufacture of "all manner of hydraulic controls for all possible applications outside the aircraft industry as well as within it."

To the obvious question of how a manufacturer might compromise piece reductions with workmanship standards required for a precision commodity he replied:

"I have no intention of approving any reduction in quality."

"I am convinced by experience that it is no more costly to produce something to high-precision standards than it is to do a 'cheap' job."

This observation, coming from

De Rudder, should result in more than casual investigation by the post-war planners of a wide variety of industries.

His comment carries weight because he doesn't talk loosely. De Rudder is Holland-born; by nature conservative. He represents a corporation owned by Transamerica Corporation. Transamerica's prime interest in Adel is that it shows a healthy profit and sound amortization of its liabilities. And, when H. Ray Ellsworth, Adel's founder-president resigned recently, De Rudder was Transamerica's choice in filling the presidential vacancy.

Sample Proof — Merchandising samples of Adel's opening line of post-war products show strong adherence to the precision workmanship vital to its war products. The consumer products to which the company is committed include a 35-mm. camera designed to take the "gamecock" set of color color photography; a "Surgecote" which adapts the camera to tissue photography in hospital surgeries; a color film slide viewer; a set of high-quality stainless steel kitchen tools; and a filling station pump for liquefied propane and butane—hard-to-handle fuels which are developing a growing commercial market.

Adel will continue to manufacture as a post-war product the line of aircraft clips which have been the company's biggest money maker, but will not depend upon them for the post-war maintenance of its industrial position.

G-E Electronic Timer

'Skills' Aircraft Riveters

An electronic timer has been cited as the "silent partner" that has enabled thousands of unskilled workers to become proficient aircraft riveters, practically overnight.

Manufacturers of the timer, General Electric Co., describes the unit's use in riveting as regulating the number of blows necessary to drive a satisfactory rivet. When the rivet has been accurately produced, the timer shuts off the riveting machine, preventing overdrive.

Varied Uses—Found to be applicable in other fields, the timer provides an accurate, adjustable, timing control for any processing, cycling, sequencing, or delaying operation. It has been applied, in various aircraft plants, to regulating grinders, milling and similar machines.



FLEITNER HELICOPTER

One of the first pictures of the German Fleitner helicopter to reach publication in this country, shows the captured rotary-wing aircraft, now wearing an AAF insignia, in occupied Germany. A. J. Weather, Jr., president of the Weatherhead Company, Cleveland, at right, and his companion, Capt. Conley Wright, inspected the Fleitner during Weatherhead's tour of German manufacturing centers. The intermediate apparently-existing rotors are somewhat similar to those on the Koller KR-4 helicopter (Aviation News, June 6), but the development predates the American machine.

Dear P.J.
The other day, at the Leland Electric Co. I saw a very remarkable concentration of power in a 400 cycle alternator.
Think you had better investigate this before you go ahead with that project we were discussing recently.
Ed

if it calls for
**CREATIVE ELECTRICAL
ENGINEERING...**
call for *Leland!*

THE Leland ELECTRIC COMPANY
DAYTON, OHIO • IN CANADA, LELAND ELECTRIC CANADA, LTD. • GUELPH, ONTARIO

Novel Wind Tunnel Revealed By United

Claimed to be largest private unit in world, new tunnel has "adjustable" inside throat.

An "adjustable" wind tunnel capable of testing full-scale power plant installations, as well as scale models of aircraft, is in use at United Aircraft Corporation.

By an ingenious arrangement outside the building housing the

testing chamber, it is possible to slide an 8-ft. testing throat inside the larger 18-ft. throat, giving the tunnel an unusual versatility. The change can be made in six hours at 500-mph.—With the 8-ft. throat, tests can be made at air speeds of up to 300-mph. With the larger test section in place, air speeds of up to 500-mph can be attained, and observations made on engines of 4,000-hp with propellers 17-ft. in diameter.

With a total length of 634-ft., the tunnel is the largest closed

current type ever to be constructed of reinforced concrete. It is also claimed to be the largest private wind tunnel in the world. It was built especially for power plant testing at the company's East Hartford plant.

Newest Jet 'Oiler' Eases Heat Factor

Shell sprays lubricates engine with spray using 95 percent chilled compressed air and 5 percent oil.

Although one of the advantages of a jet propulsion engine is a reduction in the lubrication required, the intense heat generated creates a new set of oiling problems.

Last week, Shell Oil Co. engineers, after intensive work at their Wood River, Ill., laboratory, claimed to have come up with the answer to that difficulty.

Top Claims—Said to be the most effective yet devised, a new method lubricates a jet engine by means of spray consisting of 95 percent chilled compressed air, and five percent oil.

The spray hits the ball bearings on which the single axle revolves. The air cools the metal and the oil lubricates and furnishes some rust protection. The spray is exhausted into the jet.

One of the major difficulties in a jet engine lubricant is that the oil jumps from low temperatures to 550 or 1,000 degrees in a matter of seconds. Under such conditions, the lubricant has a tendency to break down.

Heat Battle—Another quality of the ideal jet engine lubricant is complete protection from rust. Shell engineers are at present tackling this phase of the problem.

Huge Fuel Tanks Order

Reflecting the long range operations and "expedient" needs of the oncoming Pacific offensive, is an order for more than 10,000 universal dropable fuel tanks, for Army and Navy aircraft, placed with the Fibre-Body Division of General Motors Corp., at Detroit.

The completely expendable tanks, main tank of which, normally, is to provide lighter planes with added fuel for longer missions, will begin going on a shipment schedule this month and will be fabricated at Fibre's Stamping and Fleetwood units.

July Production

Despite a reduced schedule, aircraft production for July still behind for the second straight month, the War Production Board has announced. Acceptance were 5,784 against a schedule calling for 5,827. For the first time since October, 1942, production was below 4,000 planes a month.

J. A. Krus, WPB chairman, attributed much of the 344-plane deficit to two companies who were affected by non-power troubles and production changes. Both were engaged in Navy work.

The break-down for July is:

- Bombers—Scheduled, 1,463; accepted, 1,542.
- Fighters and naval reconnaissance—Scheduled, 2,613; accepted, 2,130.
- Transports—Scheduled, 538; accepted, 525.
- Trainers—Scheduled, 310; accepted, 316.
- Conversion and special purpose—Scheduled, 396; accepted, 414.

Technical "Envoys" Present Problem

Question of what to do about the technical representatives of manufacturers whose products are still being used by the Army Air Forces, but are no longer in production, is bothering both manufacturers and the Air Forces.

Particularly in this category are manufacturers of reciprocating engines which still power all of our fighters in service.

Last Reciprocitying—The AAF has already indicated the last reciprocating engine fighters have been built, and cutbacks and cancellations have sharply curtailed or, in many cases, terminated production of the reciprocating fighter engines. When these were in mass production the cost of the technical representatives in this country and overseas was absorbed in production costs. With cutbacks and terminations, this is no longer possible.

Possibilities are that an arrangement may be made to keep a reduced force of technical representatives available by separate contract, or that the AAF may elect to terminate the technical representative arrangement, and rely on its own maintenance and ground crew ability to handle trouble-shooting formerly done by the civilian representatives.

LEA Shows the Way

THE PIECES... cast aluminum plates

THE PLACE... Pacific Gear Plant Western Gear Works Vernon, California



Here is a scene typical of those in countless plants where finishing operations are carried on. A bench, a wheel, Lea Compound or Leacon and a skilled workman deburring, polishing or buffing a piece by a method devised with the help of the Lea Technical Staff.

Yes, the proper finishing of metals and non-metals calls for a thorough knowledge of the behavior of materials during the various finishing operations. It calls for the broadest experience in finishing... in burning, in polishing, in buffing.

It is here that LEA fits into the picture. We have the "greaseless" and "no free grease" compositions—lots of different grades, but it is on our technical service and sound recommendations that we have built and are maintaining our reputation as "Authorities on Finishing Operations".

THE LEA MANUFACTURING CO.
WATERSURY MA, CONNECTICUT

Barring, Buffing and Polishing... Manufacturers and Specialists in the Development of Production Methods and Compensations



How the "Adjustable" Tunnel Works: These two views of a model illustrate how the size of the testing throat is varied in United Aircraft's new wind tunnel. Left, the 18-foot throat is in use inside the building, the eight-foot throat and the larger diffuser resting on rails. Right, the reasonable test portion of the tunnel has been moved, and the eight-foot throat slid over and into the 18-ft. throat inside the building, with the diffuser section replacing the movable steel connector section.



Inside the Tunnel: Looking "downward" with the 18-ft. throat in use. At left are door and windows of the control room, an section of a hydraulically-operated, retractable, working platform extended.

FREIGHT RATES and INDUSTRY LOCATION

A SIGNIFICANT decision, announced by the Interstate Commerce Commission last May, will take preliminary effect on the 30th of August. It will eliminate some of the advantage in freight rates which Eastern shippers have enjoyed over shippers of the South and West.

The decision has been enthusiastically hailed as an Emancipation Proclamation for industrial development in the South and West. It has also been roundly condemned as a middle-class control measure that ignores valid differences in haulage costs, and recklessly blots out one of the important factors in determining the location of American industry.

Cooler appraisals indicate that the net effect of the rate changes will be far less drastic than predicted by the more passionate advocates or adversaries. Nonetheless, it is important for the business world to be informed both upon the principle at issue, and upon the foreseeable consequences of the ICC ruling.

What The Decision Calls For

The Commission's order, unless modified, or successfully contested in the courts, will require: (1) the eventual establishment of a single freight classification, or grouping of commodities for rate-making purposes, for application throughout the United States; (2) a single level of "class rates"—or rates established for groups of commodities and primarily applying to manufactured and semi-manufactured articles of high value—in the area east of the Rocky Mountains. This level is to be about 15 per cent higher than the present Eastern scale.

Because it will take some time, probably several years, to work out a uniform classification in place of the three major classifications now existing, a preliminary adjustment is provided.

Under this adjustment the existing classifications will remain in effect, but the rates on articles moving on class rates will be increased 10 per cent in Eastern or Official Territory—the area east of Lake Michigan and the Mississippi River and north of the Ohio River. On the other hand, the rates will be reduced 10 per cent on articles moving on class

rates in the South and West, and on those moving interterritorially.

What The Problem Was

At the present time there are marked differences in the levels of the basic scales of class rates in the five major rate territories—Eastern or Official, Southern, Western Trunk-Line, Southwestern, and Mountain-Pacific. It is difficult to average the levels of rates, but if the level of the class-rate scale in Official Territory is taken as 100, the levels in the other territories may be roughly considered as follows: Southern, 139; Western Trunk-Line, 128, 146, 161, 184 in Zones I, II, III, and IV, respectively; Southwestern, 161; Mountain-Pacific, 196.

These are overall comparisons. On many individual articles the differences in levels of rates are greater or less than indicated because of offsetting differences in regional classification schemes. In many cases, the use of exceptions to the classifications and of special commodity rates has reduced the regional disparity in rates. In fact, on some articles, particularly on certain low-grade traffic such as logs, pulpwood, bricks, coal, sand and gravel, the South and the West have actually had lower rates than Official Territory. The rate disadvantage of the South and West has been principally on manufactured articles.

The territorial differences in class-rate levels have complicated the problem of constructing rates from a point in one territory to a point in another. Today, such a rate tends to represent a blend of the levels in effect at the place of shipment and at the destination. Thus manufacturers and dealers in a higher-rated territory are likely to see themselves at a disadvantage when they attempt to sell goods in a lower-rated territory against competition located there.

Now, if differences between territorial rate levels are removed, the interterritorial freight-rate problem largely disappears. So it is an important question whether such differences are justified. The Commission has found that they are not justified either by differences in transportation costs or by

other valid considerations. From that finding came the order to establish a uniform level of class rates and a single freight classification.

The Decision And The Map Of Industry

What effect will this decision have on the location of industry in the United States, and what effect will it have on the economic development of the East, the South, and the West?

Today, many in the West and South believe that their higher class rates have seriously retarded the industrial development of these areas, and promoted the concentration of manufacturing in Official Territory. They point out that Official Territory has over 50 per cent of the population of the country, had nearly 70 per cent of the persons employed in manufacturing in 1940, and accounted for nearly 73 per cent of the "value added by manufacture" in 1939. Boasts of industrial development in the South, and to some extent in the West, in recent years are accompanied by claims that this would have been greater but for the freight rate structure.

Another point goes into the argument. Official Territory is not only the country's most highly industrialized section, but also its greatest consuming territory. It is the market which nearly all manufacturers desire to reach, particularly when they have a surplus to sell. Here again is occasion for an outcry by producers outside of Official Territory against the consequences of their high rate levels and the levels of interterritorial rates. Under the circumstances it is not strange that the South and West have argued long and vociferously for wide-free-mile equality in rates.

Those in Official Territory deny that the South and West have been handicapped by the rate adjustment, but at the same time look with apprehension at the loss of their rate advantage.

What's The Effect?

However, now that the ICC's ruling is about to be put in operation, it is time for the colorful statements of the debating period to give way to a sober appraisal of what the consequences are likely to be.

In the first place, it should be noted that the preliminary adjustment will affect only a small fraction of the traffic. Estimates indicate that only about 4 per cent of the full-carload traffic moves on regular class rates. About 11 per cent moves on exception ratings which are not affected by the preliminary order, and about 85 per cent moves on commodity rates, which were not within the scope of the Commission's decision. The proportion of less-than-carload lot traffic affected is much greater, since a large

part of it moves on class rates; however, less-than-carload traffic constitutes less than 1½ per cent of the total tons carried.

The permanent rate structure will probably affect more traffic than the preliminary order since, in the establishment of a uniform classification containing more classes than at present provided, many articles now moving on exception ratings are likely to be brought within the scope of the classification, and the same may be true of some articles moving on commodity rates.

But, even if a large proportion of the traffic were affected by the Commission's order, or if the principle of equality in rate levels is eventually extended to much of the traffic moving on commodity rates, these freight-rate adjustments cannot be expected to revolutionize the pattern of industrial location in the United States.

It seems evident that most industries now found in Official Territory are located there for other advantages than that of a lower level of freight rates, undesirable as such an advantage is, broader as that in the case, they have little to fear from equalization of the rate levels. For those which have, indeed, been dependent upon preferential rates and others were badly located, the removal of the preference and their consequent shift to some area possessing a real locational advantage would be desirable from the point of view of the national economy.

While the high degree of industrial concentration in Official Territory does not rest on such a flimsy basis as a lower level of class rates, the Commission's decision does remove one existing handicap to the growth and development of the South and West. The new adjustment should permit all sections of the country to develop the industries for which they have natural advantages. It should contribute to a sounder regional specialization than we have heretofore had.

This decision will neither destroy the economy of the industrial East, nor will it, overnight, assume the industrial flowering of the South and West. Its contribution one sound step toward establishing that equality of opportunity for all sections of the country which is essential to a nation that bears the proud title of The United States.



President, McGraw-Hill Publishing Co., Inc.

THIS IS THE SEVEN OF A SERIES

PERSONNEL

Charles W. Loos Dead; Was C-W Executive

Charles W. Loos, 57, a director and vice-president of Curtiss-Wright Corp. since 1935, died in New York City, Loos, as vice-president in charge of airports, handled the real estate transactions for Curtiss-Wright in the war expansion from 4 to 17 plants.

Loos joined the Curtiss Flying Service in 1925, later serving in the capacities of assistant treasurer, vice-president, and general business manager of the service, which operated a chain of 46 airports from coast to coast before expanding to its present form.

Col. William S. McDuffie has assumed command of the Eastern District of the Air Technical Service Command, succeeding Col. Kenneth Coffin who will go on inactive status and become publisher and general manager of the European edition of the *New York Herald*.

Tribune. Colonel McDuffie was formerly chief of the management control office of the ATSC's central district.

Interstate Elects Holser Executive Vice-President



F. L. Holser (photo), has been elected executive vice-president of Interstate Aircraft and Engineering Corp. L. A. Kavanaugh, secretary of the company, was elected to the additional post of treasurer.

Holser joined Interstate in 1938 as consulting engineer and has served as plant manager of the Washburn division and as vice-president in charge of the DeKalb, Illinois, division. Kavanaugh was assistant to the president until he was named secretary.

Leo J. Coffery has been appointed travel agency representative for Eastern Air Lines for Chicago and surrounding territory. Coffery was formerly connected with American Export Airlines and PCA.



TAYLORCRAFT PRESIDENT: Nath Ratz, who was recently elected president of Taylorcraft Aviation Corp., of Alliance, Ohio. He was formerly chairman of the board and is also president of Devo Aircraft Corp.

Former NACA Official Named To Ranger Post



Ernest G. Whitney, former assistant executive engineer of the Cleveland Laboratory of the National Advisory Committee for Aeronautics, has been appointed assistant chief engineer of the Ranger Aircraft Engines division of Fairchild Engine and Airplane Corp. Whitney was with NACA for nearly 15 years at the engine research section of the power plant division at Langley Field.

D. C. Kilgore (photo), has been appointed general superintendent of Globe Aircraft Corp., Fort Worth. Kilgore is a former production executive of Consolidated-Vultee and North American Aviation. He will work on war production contracts and plan for the assembly line production of the Swift, personal airplane planned by the company as its first post-war product.



D. Franklin Kell, formerly associated with the Civil Aeronautics Board as public contact, has joined the legal staff of Delta Air Lines. He delays will include assisting in cases affecting new routes. Kell was formerly with HFC, State Department, and Interior Department.



AIRCRAFT OFFICIALS VIEW P-80:

Col. Harold E. Hartney, aeronautical consultant, Don Laithers, executive assistant to the general manager of the National Aircraft War Production Council, Clyde Vandenberg, former manager of the East Council, and Richard Palmer, general manager of the National Council, examine a P-80 Shooting Star on exhibit at Washington's National Airport.

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Sale of 4,000 EAL Shares Highlights June Stock Shift

Important dealings also reported among aircraft manufacturers; numerous small common stock transactions listed by TWA; NWA, Pan Am, United also experience sizable sales.

Among the more sizeable transactions by officials of air transport companies during June was the sale of 4,000 shares of Eastern Airlines, Inc., common stock by I. S. Rockefeller, a director, president, purchased 12 shares, bringing his holdings to 212 shares, while C. E. Fleming, vice-president, exercised an option for 34 shares, increasing his holdings to 51 shares. R. C. Coker, vice-pres-

In reporting the transaction to the Securities and Exchange Commission, Rockefeller disclosed that his holdings at the end of June consisted of 31,000 shares.

▶ **NWA**—Alerce Jellies, a director of Northwest Airlines, Inc., reported the sale of 1,990 shares of the common stock, leaving him a balance of 25,530 shares at the close of the month.

Fan Am—Sale of 3,700 shares of Pan American Airways Corp. capital stock was reported by R. M. Fairchild, a director. Fairchild's holdings at the close of June amounted to 29,949 shares. Mark T. McKee, also a director, bought 286 shares of the capital stock in June, which represented his entire ownership in the company at the close

at the month.

► **UAL**—Gusiner Cowles, Jr., a director of the United Airlines, Inc., director of the 3,800 shares of UAL common stock owned by United's common stock.

► **Register and Tribune Co.**, reducing its holdings of that class of stock to 2,700 shares. Register and Tribune Co. also sold its entire holdings of United's 44 percent cumulative preferred stock, consisting of 10,000 shares, said Cowles.

► **WAL**—Walter E. Fund, Inc. holdings were of the same amount.

► **WAL**—W. E. Dworkick, executive vice-president of Western Air Lines, Inc., increased his holdings to 10,040 shares of common stock through the purchase of 50 shares.

► **Papa**—There were a number of important transactions among the common stockholders. The director of The Airways Corp.

TWA—There were a number of small transactions in the stock of Transcontinental and Western Air Inc., Fort Worth, Texas, during the year. First National Bank of Dallas sold 87,000 shares to TWA at \$9.625 per share; his holdings to 8,791 shares through the purchase of 287 shares from A. Collins, vice-president of TWA. The bank also sold 100 shares at the end of June. Thomas B. Wilton, chairman, acquired 358 shares through an employee stock purchase plan. He now owns 838 shares. John G. Floukey, president, sold 19,662 shares of the common stock, reducing his ownership to 4,306 shares. William T. Page, executive vice president, sold 10,000 of 15,000 shares in May, leaving him a balance of 375,670 shares at the end of that month.

Pennwalt—The Board of Directors of Pennwalt Chemical Corp., Omaha, Neb., has authorized the sale of 1 million shares of common stock held by Grumman Aircraft Engineering Corp. to hold a total of 8,900 shares of the common stock during the year, leaving the company with 100 shares.

32 — FINANCIAL AVE

of the month. Edmund W. Poole, treasurer, reduced his holdings to 12,000 shares through the sale of 1,200 shares. L. A. Swarthol, executive vice-president sold 300 shares giving him 14,900 shares at the end of the month.

► Martin—William K. Ebel, vice-president of The Glenn L. Martin Co., sold 360 shares of the common stock, leaving his balance at 350 shares at the close of the month.

• Other transactions included: Sale of 800 shares of Beech Aircraft Corp. common stock by Walter H. Beech, president and principal stockholder, leaving him a balance of 16,828 shares.

Sale of 300 shares of Bendix Aviation Corp common stock through a trust reported by Paul H. Davis, reducing the holdings of the trust to 700 shares, sale of 300 shares of Bendix common by David Thomas, a director, giving him a balance of 368 shares.

Anything to say to these top Aviation men?

James Work, principal stockholder of Brewster Aeronautical Corp., reduced his holdings to 85,750 shares of common stock through the sale of 1,900 shares in May. He reported another 190 shares held in a trust.

W. E. Heall, an official of Boeing Airplane Co., bought 100 shares of the common stock in May, giving him 160 shares at the end of the month.

8 M. Fairchild, principal stockholder of Fairchild Camera and Instrument Corp. and Fairchild Engine & Airplane Co., sold 1,500 shares and 1,000 shares of the common stocks of the two companies, respectively. At the close of June,

Fairchild held direct \$8,978 shares of Fairchild Camera, and another 25,844 shares through Mills Land Corp. In Fairchild Engine he held direct 217,937 shares and through Mills Land Corp. 36,100 shares.

Grumman Salaries

Grumman Aircraft Engineering Corporation, Bethpage, N. Y., reports payment of \$85,650 during 1944 to its president, L. R. Grumman, Flomont, N. Y., in its annual report filed with the Securities and Exchange Commission.

L. A. Swirbul, Brightwaters, N. Y., executive vice-president, received \$83,684, and W. T. Schwedler, Farmingdale, N. Y., vice-president and chief engineer, was paid \$32,150.

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PRIVATE FLYING

Drastic NATA Remodeling Tightens Policy Statements

Board action "fences off" president's power to take action in association's name without prior board approval; Mooney recedes as acting executive director; offices shifted; executive committee expanded.

By ALEXANDER McSURELY

Drastic remodeling of the policymaking setup of National Aviation Trades Association, accomplished last week at an atmosphere-packed one-day closed session of the board of governors at Kansas City, is expected by the board to bring about a greater working effectiveness and better representation of the membership's views.

To observers familiar with the discussion which has existed within the association in recent months, it was apparent that the actions taken had a primary purpose of "fencing off" NATA President Roscoe Turner, of Indianapolis, from taking any action in the name of the association without the prior approval of the governors.

Definite Election—Also, while there has been some talk of passing NATA's election this year and confining Turner in office, because of the difficult transportation situation, the board made it clear that an election will be conducted this year to name new officers, by mail if necessary.

There are no plans at the present time to hold a convention in December, because of GDI restrictions.

Several statements by Turner have provoked criticism by the membership, but a recent statement in which he put NATA on record on international policy for granting of air routes, was subjected to particular censure. It was the general expression that NATA, as a non-scheduled aviation service operator group "had no business" expressing its policy on such a matter.

Mooney Replaces—Retirement of Clarence H. Mooney as acting executive director of NATA, will be effective between Sept. 1 and Oct. 31. Leslie H. H. Schwartz, Jr., of Worth, chairman of the board, announced, and negotiations are now

in motion to obtain a new executive director whose name will be disclosed soon. Mooney, likewise, had been "under fire" of members who felt that his public statements and newspaper columns "too much Turner" and not enough the viewpoint of the membership at large.

Other important changes announced.

National Headquarters of NATA will be moved from Kansas City to Washington.

The NATA Secretary, weekly newspaper, which was to have

published its fifth issue last week, is discontinued.

It was decided that neither the president nor the executive director shall issue future press releases governing association policy matters without clearing them first with the board.

It was decided that the executive director shall have complete charge of the business operations of NATA, acting "directly" under the board of governors and the president.

It was voted to add three members to the executive committee to increase its total membership to nine. Added were: Howard T. Aizer, Bloomington, Pa., Region 1 governor; Joseph Garande, Boston, and Vern Davis, Winston-Salem, N. C. A quorum of three executive committee members will be required for the Washington sessions. Sessions presided at the session which was attended by: Turner, Beverly Howard, Grangerburg, S. C., first vice-president; Norman Larson, Fresno, Calif., second vice-president; Aubrey Arthur Curry, Galesburg, Ill., Region 3 governor; John Y. Burke, Oklahoma City, Region 4 governor; F. C. Anderson, Des Moines, Region 5 governor, and two regional presidents.



HARLOW-INTERSTATE DEAL:

Contract for the sale of Interstate Aircraft and Engineering Corp.'s complete line of biplane designs to Harlow Aircraft Co., Alhambra, Calif., was signed, as shown above, by Don P. Smith, president of Interstate, right, and H. F. Keenan, president of Harlow. Interstate plans to manufacture vending machines, refrigerator compressors, and small propane systems at its El Segundo, Calif., plant.

James C. Johnson, Springfield, Mo., Regan 5, and Carl Schumier, Spokane, Wash., Regan 7.

Joint Office—For the past few weeks NATFA has occupied a Washington office jointly with the Federal Airlines Association in the Denmore building, but continued to maintain its Kansas City office. Presumably the transfer will require a larger Washington office.

Rubber Co. Sales Plan

Plans to distribute tires and other aviation products to every airport in the country have been announced by General Tire & Rubber Co., Akron.

Distributors will be stationed at

key points to serve nearby airports. They will include in their line not only tires but many other accessories for use of private flyers. The sales campaign will include display stands for tires, and other commodities, signs, stationery and advertising aids.

Giders, Engines In RFC Package

Sale of 200 Taylorcraft TG-6 two-place gliders convertible to powered aircraft will be advertised shortly by the Office of Surplus Property of the Reconstruction Finance Corporation, Engines, 45-hp. Franklin and Lycoming,

will be sold with the gliders, the two constituting a "package." At present, there are only six engines available, although RFC expects to obtain a sufficient number to match the gliders.

Price on the gliders will range from \$183 for a repaired craft to \$483 new. A similar range in engines will be from \$150 to \$405. Some gliders are available with trailers, the latter costing \$75.

Five sales centers will handle the gliders and engines: Ft. Worth, Oklahoma City, Albuquerque, Phoenix and Omaha, Neb.

New Field Spacing Guide Recommended

A new set of recommended standards for spacing between airports, issued recently by the Civil Aeronautics Administration, provides more flexibility than the tentative standards first circulated for comment.

The recommended standards do not have the force of regulation, but are issued for the guidance of local communities, governmental units, and private operators who are establishing new fields or enlarging present airports.

Recommendations are:

- Airports at which instrument operations are to be conducted simultaneously will require sufficient separation from center to center to prevent conflict and overlapping in the holding and approach patterns during simultaneous instrument approaches.

- For strictly contact operations, airports should be located far enough apart so that their respective contact traffic patterns will not conflict. As a general guide the same of the contact patterns for various classes of airports may be considered: Class I, one mile radius; Class II, two mile radius; Class III, three mile radius; Class IV and above, four mile radius.

- It is understood that operations at a contact airport located within the pattern of an instrument landing airport may be limited during the time that instrument operations are being conducted at the instrument airport. Such limitations should be worked out by Federal, state, and local officials when establishing the air traffic pattern for the entire area.

- In selecting sites for new airports consideration must be given to existing and proposed instrument landing systems.



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NEW VIEWS OF MIDGET PIPER

Interesting photographs of the Piper Skycycle, one-plane experimental plane which, if placed in production, may retail for just \$999 to \$1,000, show the trim, little low-wing monoplane in flight, above, and show details of the bubble Plexiglas canopy, below. With a 40-hp engine and 20-ft wingspan, the Skycycle is designed to cruise 250-400 miles on 15 gallons of gasoline at a 20-mph cruising speed.



First off in comfort is the luxuriously styled, padded seat of the standard and standard-cabin. There's full visibility in all directions for pilot and passengers.



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FREE SERVICE MANUAL A new and complete Service Manual for owners of the Stinson Model H-2A (Voyager 125) is now ready. Send NC and serial numbers of your Voyager 125 for your free copy... to Stinson, Wayne, Mich.

Flight Instruction Experiments Point New Teaching Techniques

University of Tennessee program expected to have far-reaching effect on civil pilot training here and abroad as experts seek to accelerate courses to about one-sixth present duration.

Experiments being conducted by the University of Tennessee Institute of Aviation Psychology in methods of teaching people to fly more quickly and more safely, are expected by Dr. Robert G. Walker, head of the Institute, to have a far-reaching effect on civil flying instruction in this country, and perhaps throughout the world.

First findings of the institute are to be reported this fall after data on more than 100 students taking

the experimental training has been analyzed.

Study State—To date, 80 students have completed the course at Knoxville, Tenn. All students are given 60 hours in ground and basic flying work, with 33 hours of flight training, after which the class is divided for the testing.

The students are paired off through tests, matching them as nearly as possible as to aptitude, age, sex and proficiency. Then one group, the "control" students,

are taught by conventional methods, while the experimental group is taught by new methods. Results are tabulated and data analyzed, to evaluate the advantages of different instruction methods.

First problem, already completed, was to investigate whether or not the training of students to fly without regard for air speed indicators has been a good one. In many schools it has been the practice to teach flying by the feeling of motion because of the vastness of instrumentation in small planes.

Costly School—The project is financed 70 percent by the National Council of Research, and 30 percent by the Tennessee Bureau of Aeronautics. More than \$100,000 worth of equipment, 18 specially equipped planes, six instructor-pilots, three research pilots, and a maintenance and clerical staff of five are assigned to the institute, in addition to the University's faculty.

Data is compiled from camera recorders which show the plane's movements, and instrument readings. Electric contact wiring devices record landings, showing which wheel hits the ground first. Wire voice recorders in the planes take down conversation between students and pilots, which have already proved that many times the best instructors, in the stress of the moment, may tell the student to do the wrong thing.

The institute was started, because of a need for a new scientific basis for pilot training. Early attempts at research with Civilian Pilot Training program trainees or Army and Navy pilots proved unsuccessful because of the limited time that individual students were available at one training center.

State Boomer—Tennessee was selected as the location, by the CAA and the research council, because



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NEW FUEL TRAILER UNIT:

A new airport fueling-trailer unit developed by Esso (Standard Oil Company of New Jersey) aviation engineers is in experimental service at Arthur C. Myde's Congressional Airport, just outside Washington, D. C. The 600-gallon tank trailer may be pulled by a tractor or jeep as shown above, and is equipped with an overhead wing type boom enabling it to service aircraft approaching from an angle, as shown below. Fitted with a small single-cylinder gasoline engine driven pump, the new mobile unit is designed for small and medium airports, to take the place of, or supplement, stationary underground tank installations. Three manufacturers are building versions of the fuel trailer, and assembly line production is planned at the end of the experimental service period, Esso reports.



of the active Tennessee Bureau of Aeronautics, the success of the Tennessee CPG program, and the state's aviation financial progress including the 8 cent aviation gasoline tax.

The Nashville Tennessean, in a recent issue reporting on the instructor's work, pointed out that from it may come the day when pilots may be taught to fly safely in six weeks as against the current nine months Army and Navy course.

Dr. Walker is emphasizing the primary importance of safety in civilian flying, throughout the tests.

Air Forest Patrol

New Income Field

Georgia experiment indicates fire observation courses would logically go to local operators.

A regular source of income for many southern aircraft service operators may develop from experimental fire observation flights conducted by the Georgia Forestry Service Inc., and the Georgia Forestry Department.

Southeastern has been flying patrol over five counties in the middle Georgia area on a 198-hour basis.

McDonald—Ben T. Smith, Southeastern's president, said a close check on costs demonstrated that patrols can be more economically flown by contracting with operators in various sections, instead of on a state-wide basis. This method will be recommended in the Southeastern report.

In test flights, two patrols of approximately 40 hours each are flown each day that weather conditions are favorable. Fortunately, adverse flying weather also retards forest fires.

The tests are being flown in a Luscombe 8-B at a contract price of \$6 an hour. Radio equipment is supplied by the forestry department and only one-way plane-to-ground communication is used. Two-way communication would be advantageous, pilots report. Present equipment is considered too heavy as a permanent installation because it reduces utility of the plane.

■ **Safety Speed**—Charles M. Everett, director at Milledgeville, Ga., operations base for the patrols, reported that the experiment shows that average time between observing a destructive fire from

First Example Hit

After nearly eight years of flying, the original formation, status of development in a recent storm, appears headed for retirement.

The "Japs" as Engineering & Air Corp. employees call the plane, made her maiden flight Oct. 1, 1939, and had a rugged life for the first few years as pilot after pilot took her up determined to "wing out" the plane, and put it into a spin. But, instead, Japs was certified by the CAA as "mechanically incapable of spinning."

■ **Unique Engine**—The Japs' powerplant, a 16-hp KRCO engine, is the only one of its kind, built by the company when no other suitable engine was available. It was developed by other manufacturers, however, caused KRCO officials to shun their engine building project, and use powerplants provided by other companies.

In recent years the plane has been owned by a small group of firms who kept it at Bolson Airport, Greenville, Md.

the air and start of suppression work has been 14 minutes. But other advantages have been shown in the air patrol.

In making a check on the work of ground crews it is an effective preventive measure since farmers and sawmill operators are less apt to set dangerous fires when they know an air patrol may spot them and prosecution may result.

Whether "bombs" quoting forest fire laws are carried in the plane and dropped near any individuals spotted setting fires. ■ **High Value**—Average distance from each smoke fire has been 14 miles in good visibility over the fairly level area now being patrolled. The majority of Georgia's forests are pine and hore, in a recent year, have developed into an eight-year "cane crop" of immense economic value to the state.

Smith says that the test indicates a close margin on cost, counting the pilot's time. Under present conditions of civilian flying, however, the pilot's time is not fully occupied, and the patrols are being run at times when there is no risk of fire students at the base.

The test also shows that patrols can be flown over a compact area, near the airport base, without wasteful flying and therefore the cost can be kept reasonably low,

Smith said. However, if it were necessary for the plane to travel at or 144 miles in order to get to the territory it is scheduled to observe, cost would mount. For this reason, Smith believes that forestry departments should contract with local operators over the state for patrol of their immediate area.

Luscombe 'Center'

Gets Two Hangars

Construction work on the new Luscombe Airplane Corp. manufacturing, servicing, and aircraft operations center near Dallas, Texas, has progressed to a point where two hangar units are nearing completion.

Some of the company's servicing operations already have been moved into the first hangar, and work of completing interior construction of shop and office areas is progressing.

■ **Silvaco Output**—Parts for the two-place Luscombe Silvaco are being fabricated at a rate to insure adequate servicing of planes now in the field, and to anticipate future requirements. Leopold Klotz, Luscombe president, said.

War production work is continuing at the downtown factory in Dallas, leased by Luscombe, and at the company's three plants in Trenton, N. J., while preparations are also being made for post-war plane construction at the downtown Dallas factory.

Klotz said that no definite schedule for personal plane production could be set now because of war work commitments, but that the company did not expect to lag behind production of other personal plane manufacturers.

Tenn. Air Commission

Appointments Announced

Electron of Charles Radford, Nashville, as chairman of the Tennessee Aeronautics Commission, succeeding W. Percy McDonald, who resigned recently, has been announced. McDonald will serve the commission as legislative consultant and in an advisory capacity, as his private business permits.

John Lovell was reappointed a member of the commission, from eastern Tennessee, while Robert Green was appointed executive representative. Herbert Fox was reappointed executive director of the bureau of aeronautics, and secretary of the commission.

Gasoline Combustion Heater Slated For Lightplane Usage

Janitor installation of new, small, 15,000 BTU unit in one cabin plane already approved by CAA; low cost post-war production expected to provide personal craft with warmth of larger warplanes.

New comfort in post-war private planes is in the offing with announcement of a small 15,000 BTU Janitor gasoline combustion airplane heater by Surface Combustion Corp., Toledo, Ohio. One installation of the new heater, in the Waco Aircraft Company's three-place VHS-1F biplane, already has been approved by CAA.

The heater is the smallest of several models, ranging up to 185,000 BTU, which are used on such planes as the Martin Mars, Douglas Rhynociter, Curtiss Commando, Lockheed Constellation, and Boeing Stratoliner, and on numerous smaller military planes.

■ **Acceptable Price**—The manufacturer expects to be able to provide the smaller heaters for light aircraft "at prices acceptable to owners," and will engineer installations for a number of other planes besides the Waco.

Charles Moffitt, Waco service manager, reporting on tests with the Waco cabin plane equipped with the 15,000 BTU model, said that the plane was able to operate in outside temperatures well below zero, while passengers remained comfortable without extra costs. The older muff-type heater used, he said, was unable to provide sufficient heat when outside temperature dropped below 40 degrees.

The unit includes a jacket or outside slow-type casing, which fits around a combustion chamber of special alloy steel, welded in a jet-tight seal.

■ **Fuel Plan**—Gasoline from the engine fuel supply is piped to the heater entering the combustion chamber through a vaporator.

Air enters at a tangent to the inner surface of the chamber, creating a whirling action to mix fuel vapor and air. Ignition is performed by a glowing lighter to an electric cigar lighter.

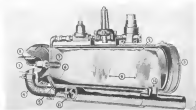
The flame continues to whirl through a series of baffles to insure complete combustion when the exhaust gases are expelled. Meanwhile, fresh air enters from a scoop on top of the fuselage, and

is forced by the forward motion of the plane through the areas between the combustion chamber and the outer jacket to absorb the heat.

■ **Heat Sent Outlets**—The heated air



Gasoline Heater For Private Planes: CAA-approved installation of a 15,000 Btu Janitor combustion heater in a Waco five-passenger VHS-1F, marks another adaptation of military aircraft developments for post-war private planes. Above: Installation diagram shows air intake scoop and duct to heater; heat outlet to cabin, exhaust gas outlet and controls. Below: Cutaway drawing of heater shows: 1, ventilating air inlet; 2, alloy combustion tube; 3, heated air outlet; 4, connector; 5, air inlet nozzle; 6, fuel-air mixture; 7, vaporizer; 8, pilot pipe; 9, internal baffle; 10, exhaust opening; 11, spring-loaded valve.



returned military flyers, who become private plane owners, since they have learned the advantages of this type heater on military planes.

The combustion heater, also, it is pointed out, will eliminate need for the frequent inspections required by CAA on muff-type or exhaust type airplane heaters, to insure against possibility of exhaust gas leaks into the heated airstream.

Under all conditions of operation, the Joastrol heater has less pressure in the combustion chamber than the pressure of the ventilating air passing around the chamber, so as to eliminate any danger from exhaust gases, the manufacturer asserts.

"Flying Farmers" List Lightplane Uses

More than 100 lightplanes transported "flying farmers" of Texas, Arkansas, Tennessee, Kansas, Nebraska, Iowa and Oklahoma, to Stillwater, Okla., for the recent two-day session of the Oklahoma Flying Farmers at Oklahoma A. & M. College.

There the farmers inspected new models of Piper, Aeronca, Taylorcraft, Ercoupe, Stearman, Globe, and Funk planes which were displayed on a parade ground at the college campus and discussed agricultural uses of light-planes.

Threshing Business—Gene McGill of Alva, Okla., said he uses his plane to keep three wheat threshing combines and 34 men busy by spotting likely fields from the air and then landing to select the owner's business.

A Kansas farmer told how he had saved a large quantity of wheat by flying a 130 mile round-trip to Kansas City to obtain a needed part for his combine, which had broken down in the middle of threshing. Four hours after the breakdown, the machine was back in service; in time to beat a threatening storm which would have damaged or destroyed the crop.

A rural letter carrier reported that he had used his plane in emergency to drop important mail to isolated rural residents of Oklahoma, when he was unable to reach them because of snow on roads.

Planning Flares—Other speakers recommended flares for planning contour farming to prevent erosion, and to supervise ranching.

Briefing *For Private Flyers and Non-Scheduled Aviation*

Mass Manufacturing Company of LeMars, Iowa, which owns rights to manufacture the Skyfyer under the new name of Mass Skyfyer, has the first plane in its production virtually completed, and has seven other on the production line. The plane is expected to sell for approximately \$2,495. The company, owned by Western Union College of LeMars, purchased the rights to make the Skyfyer from Grand Rapids Industries, which in turn had brought them from General Aircraft Corp. The plane, built to specifications of the original Skyfyer, will be two-control, spin-proof, with tricycle gear.

SOUTHEASTERN FIRE—Seventeen planes were destroyed in a recent hangar fire at Southeastern Air Service's Atlanta, Ga., municipal airport base, causing total damage estimated at \$96,000, largely covered by insurance. Cause was attributed to static electricity resulting from a fire-up of a radio transmitter in a twin-engine Cessna, which burst into flames and fell from the sky. The plane fell to the wing of another, alongside, the wing bent and flames leaped from plane to plane. Eight of the planes destroyed were owned by Southeastern including one Taylorcraft, one Piper "Cub," two Porterfields, two Stinson "Helians," a Cessna, and Southeastern's "Erebus" demonstrator. Other planes not included those "Aerocraft," a Bellanca, a "Waco," a Taylorcraft, a "Cessna," and a "Lullaby," a small sailplane. When the fire broke out, almost coincidentally with planes brought in from their Southeastern base.

CLEAN DESIGN—The three-place Johnson Rocket 180 is going on a national exhibition tour as soon as the plane receives its NC. Plane is designed for high performance and reduced drag in even such small matters as recessed door handle, and specially designed wing tips which eliminated need for wing fences, a speed reduction factor. Priced tentatively at \$8,000, the Rocket has enough extra features to make it interesting as a business plane in spite of its price. Oddly enough the Rocket uses stick control instead of the wheel control usually found on planes of its price class.

TWO OR FOUR? Al Mooney, Calver chief engineer, reported at a recent CAN forum that his company had a plane design which could carry four persons, under the new categories, not stressed for aerobatics, or could qualify for aerobatic flight as a two-place plane. Whether this is the model which Calver has announced it expects to build is still being decided. The company's president, Al Mooney, says it will be one of the first in the present field to produce an "absolutely new" airplane. The company has had probably as much plane production experience, during the war, as any other lightplane manufacturer, making radio-controlled target planes comparable in size to its pre-war Calver "Cats" for the Army and Navy. Incidentally, Mooney says its present plane will be ready next year. "We are working on a design which we would like to make right with a pre-war Calver" so that he could get into the cockpit

FROM WOODS TO AIRPARK—Private flyers at Fryburg, Maine, wanted a nearby airport and went to work on a woody tract near town, partly burned over. By the end of summer, NAA's Airport Digest reports, they expect to have one landing strip ready for operation. Eventually, the project calls for tennis courts, bowling alleys, bathing and boating, horseback riding and, perhaps, a golf course. Work involved clearing of trees, burning brush and limbs, grubbing out roots of small trees, leveling, seeding, fertilizing. But the finished airport will be close to town, instead of 12 miles out; the distance of the next nearest field.

CAP PLANE RENTALS—Of 6,799 hours of flying by pilots of the First California CAP Group in the 12 months ending May 30, \$25.3 per cent, or 2,216 hours were flown in planes rented from aircraft service operators. At a conservative \$7 an hour, less than the rates published by many of these operators, this totals \$44,816 spent by pilots of the First Group.

—Alexander McBurnets

TRANSPORT

Added Redeployment Contracts Anticipated By Airline Officials

Use of lines other than four transcontinentals and Pan Am believed awaiting only overcoming of East-West bottleneck; Boston and Norfolk said to be among newly designated air troop movement centers.

By MERLIN MICKEL

Informed persons in the air transport industry last week saw a good chance that airlines other than the four transcontinental and Pan American Airways may be brought into the steep redevelopment picture as soon as the east-west battleship has been broken

Initial assignment on the job, entailing movement of 25,000 loads a month under Army contract issued from regular commercial operation, has gone as was expected to American, Northwest, United and TWA, with the addition of Pan Am. Efforts are being made to stall operations under the charter contract by Sept. 15 days later than the original contract.

Airline screens and the original program was to "pace off" the work to all airlines, but that was before decision to use only one eastern terminal, that at Newark, N. J. There appears now to be some likelihood that reemployment Rights may be made later from other east coast ports, such as Boston and Norfolk, in which event other airlines than those already named may be called on. A War Department spokesman said, "we'll call as them if we need them."

As it now stands, each of the five airlines with which the Army Service Forces and Transportation Corps will contract for the work previously through the Air Transport Command, is to receive 27 C-47s, of which it will use 18 in the operation and two for training. Those have been and are being overhauled at Air Technical Service Command's repair base at San Bernardino, Calif., where they are being turned out in priority at the rate of one each day and a half.

Preparation for the new task is the big problem now. Altogether, the five lines are planning 22 round trips a day between the east

coast terminals, and was given Chicago and Detroit as inland co-terminals in the recently-denied North Atlantic case.

The personnel situation remains one of the major difficulties in the redeployment program, although the Army has announced it will make 380 pilots available to the airlines for the job. These are to be placed on inactive status, and will go on the airlines payrolls. Some former airline pilots in the group may be eligible for jobs as captains; some will be co-pilots, which will permit upgrading of present airline co-pilots to pilots. The pilot draw is evident as Wallace's statement that it plans to use 128 pilots on its current operation, which calls for four round trips daily between Newark and Seattle.

carriers wrestle with these and other problems, the *Arrest* con-

AEA-AA Officials Set  As a follow-up on American Airlines' acquisition of American Express Airtime, the Civil Aeronautics Board has approved interlocking relationships of four men in the two companies, now comprising the newly named American Airlines System.



AWAITING OVERHAUL

Part of nearly 300 Douglas C-47 cargo planes receiving overhaul priority at the San Bernardino, Calif., Air Technical Service Command repair base are shown here. Slated for delivery to the Air Transport Command, they pass through a 26-station overhaul line before they are ready to take to the air again.

Caribbean-Atlantic Mail Rate Decided

CAB finally places the postal pay scale at 21.78 cents per airplane mile on a base of 300-lbs.

A mail rate of 21.78 cents per airplane mile, effective on July 1, 1945, has been fixed finally by the Civil Aeronautics Board for Caribbean-Atlantic Airlines on AM38.

The rate is calculated on a base of 300-lbs. of mail, with excess postage to be paid for at the rate of 9.03 cent per pound mile. The Board's order made permanent the previously set tentative rates. (AVIATION NEWS, Feb. 26).

■ **Back Pay**—For the period Nov. 12, 1945, when the line started mail service, to June 30, 1944, inclusive, a flat rate of 3.35 cents per airplane mile will be paid without reference to base mileage or base postage. The Board's opinion stated that during this period, due to wartime conditions, the line experienced an abnormally high demand for its services, which resulted in profit to the carrier. Profit, before mail pay, for the months from Nov. 1, 1944, to June 30, 1944, was \$12,954, an average annual profit of \$7,910.

Because of a marked decrease in military traffic and an increase in operating costs, however, it was estimated that a higher rate of mail pay is essential for the future.

The Board estimated total non-mail revenues of \$165,375, or \$2.69 cents per revenue plane mile for the forthcoming year, while operating expenses were estimated as not to exceed \$171,584 annually, or \$2.79 cents per revenue plane mile.

■ **Income Based**—The rate fixed for

NAL Expansion

Caribbean-Atlantic Airlines is among two of National Airlines' Lockheed Lodestar on charter operations for cargo and passengers between San Juan, Puerto Rico, and Miami. The 18-day foreign flight authorization under which the flights are being made was issued by Civil Aeronautics Board to National, with Caribbean-Atlantic as the sponsor of the flights. It expires late in October. National has purchased Caribbean-Atlantic, which operates in Puerto Rico and the Virgin Islands, subject to CAB approval.

Caribbean-Atlantic will yield an additional 2.80 cents per revenue plane mile, covering estimated operating deficit and providing a rate of return of about 10 percent after taxes.

In its opinion, the board felt that the airline was entitled to this rate of return "in view of the varying circumstances relating to war, the unusual operating conditions, and the resulting risks."

23 ATC 'Liners' Flew Potsdam Trip

Standard Air Transport Command procedure, established in three previous Big Three Conferences starting with that at Casablanca in 1943, was followed on the recent trip of President Truman to Potsdam.

The President himself traveled by air only from Brussels to Berlin. The approximately 175 of

conference personnel who didn't make the Atlantic crossing by boat, however, made the crossing by air. Round trip was about 16,000 miles.

■ **Air Fleet**—ATC used 19 C-54s, accompanied by another operated by the Navy. Seven C-87s from ATC's European theater also were used. Ten of the ATC 54s were C-54Es, four were C-54Ds, and the other was the Presidential plane with its special crew.

New Off-Airways Altitude Rule Set

Crossing altitudes for instrument flight off airways now is determined by the magnetic heading rather than the true course, in accordance with amendment of Part 63, Civil Air Regulations, effective Aug. 1. Originally the altitude levels were based on true course.

Vacant flight levels, in even and odd multiples of 500-ft. are stipulated by the Board for each of the four quadrants of the compass.

■ **Quadrant Rule**—Under the amendment, the off-airway pilot determines which quadrant he is in by magnetic compass reading, whereas previously he based his determination on calculated true heading (compass course minus or plus deviation).

Upon recommendation of the Interdepartmental Air Traffic Control Board, CAB discussed the matter with all parties concerned and concluded that altitude regulations shown in Air Traffic Rules will be maintained in a more practicable manner if based on magnetic headings as shown by the

aircraft's compass. All pilots have access to the compass course at all times, whereas the true ground course is not always known.

Building Bidder For AAL Airliner

Believed first line to submit own design for manufacturing equipment; 20-30 passenger plane model.

American Airlines' submission to several aircraft companies of specifications for a new type airplane, with a request for cost and delivery estimates 25, 50 and 100 by Aug. 15, may mark the beginning of a new trend in equipment purchase methods.

Traditionally the manufacturers have built the type of planes they thought best, and the airlines have studied the market then bought what they believed they needed.

■ **Idle Pool**—More recently, starting with the original Douglas DC-4, the line's engineers have pooled their ideas on what was required and turned the result over to the manufacturers. An outstanding example is the work of Air Transport Association's Aircraft Requirements Committee.

American's action, however, is believed to be the first in which an individual airline virtually has called for bids, although such a step long has been expected. (AVIATION NEWS, June 12, 1945).

The earlier intention to solve the equipment question of its purchase decision "within a reasonable time" after receipt of proposals. American expects the final purchase price to run between \$5,000,000 and \$20,000,000 but feels the size of the order is not contemplated, which it says will be the largest numerically ever given by a single airline at one time, will result in substantial savings in production costs.

■ **"Shortliner"**—As described last week by William Littlewood, AA's vice-president in charge of engineering—also head of ATA's Aircraft Requirements Committee—the new plane would be used in domestic service where traffic is relatively light and distance between stops is comparatively short.

It would accommodate from 30 passengers and baggage, plus 500-lb. of cargo, to 30 passengers and baggage, plus 2,500-lb. of cargo. Crew would be two flight officers



VIKING DEBUT:

First pictures of the new British Vickers Viking show it on the ground and in flight. Seen by some as Britain's challenge to the Douglas DC-4 (AVIATION NEWS, July 9), the plane comes in both 21- and 27-passenger versions. Power plant is two Bristol Hercules 16-cylinder absolute-varying engines. Maximum range is 2,500 miles, economical cruising speed 215-mph.



and one cabin attendant. Other details:

■ **Maximum Payload**—8,000 lbs. ■ **Maximum Speed**—1,400-1,500 mph. ■ **Range**—2,500 miles. ■ **Endurance**—270 hours. ■ **Altitude**—15,000 ft.

■ **Maximum Groundspeed**—175 mph. ■ **Maximum Cruise Speed**—215 mph. ■ **Maximum Climb Rate**—1,000 ft. per min. ■ **Maximum Descent Rate**—1,000 ft. per min. ■ **Maximum Turn Rate**—1,000 degrees per min. ■ **Maximum Roll Rate**—1,000 degrees per min. ■ **Maximum Pitch Rate**—1,000 degrees per min. ■ **Maximum Yaw Rate**—1,000 degrees per min. ■ **Maximum Sideslip Rate**—1,000 degrees per min. ■ **Maximum Roll Rate**—1,000 degrees per min. ■ **Maximum Pitch Rate**—1,000 degrees per min. ■ **Maximum Yaw Rate**—1,000 degrees per min. ■ **Maximum Sideslip Rate**—1,000 degrees per min.

■ **Maximum Cruise Altitude**—15,000 ft. ■ **Maximum Climb Rate**—1,000 ft. per min. ■ **Maximum Descent Rate**—1,000 ft. per min. ■ **Maximum Turn Rate**—1,000 degrees per min. ■ **Maximum Roll Rate**—1,000 degrees per min. ■ **Maximum Pitch Rate**—1,000 degrees per min. ■ **Maximum Yaw Rate**—1,000 degrees per min. ■ **Maximum Sideslip Rate**—1,000 degrees per min.

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While American's basic design does not provide for cabin pressurization, the line has requested information on an alternate design for sea-level cabin pressure

at 8,000-ft., plus adequate winter cooling, to permit evaluation of the cost of such facilities in weight and performance.

New Air Economy Seen By Warner

Dr. Edward P. Warner, vice-chairman of the Civil Aeronautics Board, has estimated that \$10,000,000 to \$20,000,000, annually, can be saved in airline operating costs if aeronautical research continues.

He predicted that such saving could be brought about through application of the knowledge gained in the single year 1949 after the aircraft designed in that year are in operation.

■ **NACA Example**—The total amount required in the past 30 years by the National Advisory Committee for Aeronautics, Wash-



ATC at Big Three Conference: Air Transport Command planes that carried President Truman and others to the Big Three Conference at Potsdam are pictured as they arrived at Gatow Airport, Berlin.

ington, D.C., is estimated at \$10,000,000 to \$20,000,000 annually.



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